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NEW CHAIRMAN OF COUNCIL

At the meeting of Council held on Monday, 11th July, Dr. R. W. Holland, O.B.E., M.A., M.Sc., was unanimously elected Chairman of the Council for the ensuing year, in succession to Mr. E. Munro Runtz F.R.I.C.S.

FACULTY OF ROYAL DESIGNERS FOR INDUSTRY

Mr. Milner Gray, R.D.I., has now succeeded Sir Francis Meynell, R.D.I., as Master of the Faculty of Royal Designers for Industry.

VISIT OF MR. MUNRO RUNTZ TO SCANDINAVIA

The past Chairman of Council, accompanied by Mrs. Munro Runtz, recently visited Stockholm in order to hand to Herr Åke Huldt of the Svenska Slöjdföreningen an Address, the text of which is reproduced below:

The Address:

The Royal Society of Arts has not forgotten the honour and courtesy of your Society's presentation of a silver medal and address during its Bicentenary celebrations and it was thought fitting that during my second term of office as Chairman I should in person proffer a return courtesy.

To-day the Council of the Royal Society of Arts is conscious that improved means of travel and communications must render all nations more inter-dependent and barriers that formerly existed no longer prevent the easy exchange of thought upon the further application of art.

However ignorant the mass of people may be as to the value of art in industry and manufacture, its application must be of greater value as time passes.

Art should be a solace to all the senses, but to achieve this end it must percolate our everyday life, whether we be conscious of it or not.

You in Sweden have shown the world how much the application of art in industry and manufactures adds to such enjoyment.

On behalf of the Royal Society of Arts I tender greetings and goodwill.

In Copenhagen, Mr. and Mrs. Runtz visited the Royal Copenhagen Porcelain Manufactury. They were received with great courtesy and kindness by Mr. Christian Christensen, the Managing Director, and conducted round the factory by Mr. Harald van der Recke. Mr. Christensen is a Fellow of the Society who has shown much kindness to winners of travelling Bursaries in the Society's Annual Industrial Art Competitions who have visited the Manufactury.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 11th July, 1955. Present: Dr. R. W. Holland (in the Chair); Dr. W. Greenhouse Allt; Mr. F. H. Andrews; Sir Alfred Bossom; Sir Edward Crowe; Mr. Robin Darwin; Mr. P. A. Le Neve Foster; Mr. John Gloag; Sir Ernest Goodale; Mr. Milner Gray; The Earl of Halsbury; Lord Latham; Sir Harry Lindsay; Mr. F. A. Mercer; Mr. O. P. Milne; The Earl of Radnor; Mr. E. Munro Runtz; Sir Harold Saunders; Sir Selwyn Selwyn-Clarke; Sir John Simonsen; Sir Stephen Tallents and Sir Griffith Williams; with Mr. K. W. Luckhurst (Secretary); Mr. R. V. C. Cleveland-Stevens (Deputy Secretary) and Mr. David Lea (Assistant Secretary.)

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Bates, William, Manchester.
Blaxland, John Granville Charles, Hove, Sussex.
Day, Roy Thomas, London.
Garwood, Arthur Sydney, Edgware, Middx.
Gould, Frederick Thomas Charles, London.
Haden, Ian Estwick, B.Sc., Leicester.
Herbert, Norman David, London.
Hui, Cho-Ying, B.Sc., Hong Kong.
Inglis-Jones, Miss Elisabeth, Camberley, Surrey.
Jarvis, William Henry, A.M.I.E.E., London.
Lowry, Stuart Osborne, Wirral, Cheshire.
Malti, Professor Michel George, B.S., M.E.E., Ph.D., Ithaca, New York, U.S.A.
Matthews, Francis James, Ilford, Essex.
Neely, Terence, Comber, Co. Down, Northern Ireland.
Parsons, Frederick William Harcourt, Newport, Mon.
Shaw, Mrs. Corise H.M., London.
Stanley, Sir Robert Christopher Stafford, K.B.E., C.M.G., London.
Taylor, Walter Samuel, A.R.C.O., London.
Tremeer, Arthur Rhodes, Alice, Cape Province, South Africa.
Wadman, Frank James, Torquay, Devon.
Ward, Douglas Mallinder, D.F.A., A.T.D., Halifax, Yorks.

The following has been awarded Associate Membership as winner of an Industrial Art Bursary in 1954:

Stephenson, David Newton, Camberley, Surrey.

The following was admitted as an Institution in Union under Bye-Law 66:

Vancouver Public Library.

CITY AND GUILDS OF LONDON INSTITUTE

An invitation to the Society to be represented on the Art School Committee of the City and Guilds of London was accepted and Sir Stephen Tallents was appointed as the Society's representative.

ENVELOPES FOR JOURNALS

It was decided that as soon as the present stock of wrappers is exhausted, all copies of the *Journal* should in future be posted in envelopes.

PURCHASE TAX ON MEDALS

It was decided to take up with the Board of Trade certain aspects of the incidence of purchase tax on medals.

RESIGNATION OF THE LIBRARIAN

The resignation of the Librarian, Miss Margaret L. Clark, which will take effect at the beginning of October, was received with regret.

OTHER BUSINESS

A quantity of financial and other business was transacted.

TWO HUNDRED AND FIRST ANNUAL GENERAL MEETING

WEDNESDAY, 6TH JULY, 1955

MR. E. MUNRO RUNTZ, F.R.I.C.S., *Chairman of the Council, in the Chair*

The Two Hundred and First Annual General Meeting was held on Wednesday, 6th July, 1955, at 3 p.m., at the Society's House, in accordance with the Bye-Laws, for the purpose of receiving the Council's Report and the Financial Statements for 1954, and for the election of officers.

The Secretary read the Notice convening the meeting and proved that it had been duly exhibited and published, as required by the Bye-Laws.

The Minutes of the last Annual General Meeting, held on 30th June, 1954, were taken as read, the Secretary having summarized their contents, and were signed by the Chairman as a correct record.

The Chairman then called upon the Secretary to summarize the Annual Report of the Council:

ANNUAL REPORT OF THE COUNCIL

201st SESSION, 1954–1955

I. HIS ROYAL HIGHNESS THE PRESIDENT

His Royal Highness the Duke of Edinburgh, who had been prevented by his absence overseas from attending any of the earlier celebrations of the Society's Bicentenary, was present at the Reception which was held at St. James's Palace on Wednesday, 15th December. (See below under Section XII (*c*).)

On Wednesday, 21st July, at Buckingham Palace, His Royal Highness presented to Sir Ambrose Heal, R.D.I., the Albert Medal for 1954.

II. CHAIRMAN OF COUNCIL

Mr. E. Munro Runtz, who was Chairman of Council for the year 1952–53, was elected to serve again as Chairman for the year 1954–55.

During the year he has visited Malta, Paris and Stockholm in order officially to repay the visits so courteously made by the Presidents of the Malta Society of Arts, Manufactures and Commerce, and the Société d'encouragement pour l'industrie nationale, and the presentation made by the Svenska Slöjdföreningen, at the time of the Society's Bicentenary.

III. ALBERT MEDAL

With the approval of the President, the Albert Medal for 1955 has been awarded to Dr. R. Vaughan Williams, O.M., for his eminent services to music.

IV. SWINEY PRIZE

The Swiney Prize for 1954 which, as recorded in the last Annual Report, was awarded to Professor G. W. Paton, Vice-Chancellor of Melbourne University, was handed by the Earl of Radnor to Sir John Lienhop, Agent-General for Victoria, at a short ceremony in the Agent-General's office on the morning of the last Annual General Meeting, June 30th. Sir John Lienhop arranged for the conveyance of the prize to Melbourne, where it was presented to Professor Paton by Mr. John Cain, Premier of Victoria, in the presence of a distinguished company which included several Fellows of the Society. The prize consisted of a silver cup designed by Professor R. Y. Goodden, R.D.I., and a cheque for £100.

V. ROYAL DESIGNERS FOR INDUSTRY

The following new appointment has been made to the Distinction:

Uffa Fox (*small boat design*).

Sir Francis Meynell was re-elected Master of the Faculty for 1954–55, and Mr. Milner Gray served as Deputy Master.

The Faculty held its fifth annual evening reception at the Society's House on Thursday, 8th July, and on Tuesday, 24th June, it entertained the Chairman of Council and others to luncheon in honour of the Society's Bicentenary.

A new and important function took place on Monday, 24th October, when a special meeting of the Society was held for the presentation of R.D.I. diplomas. In previous years such presentations have been made at the Society's Inaugural Meeting of each session. After the presentations an address was delivered by Sir Francis Meynell, Master of the Faculty.

VI. BICENTENARY MEDAL

The second Bicentenary Medal, which is for annual award to those who 'in a manner other than as industrial designers have exerted an exceptional influence in promoting art and design in British industry,' has this year been awarded to Sir Charles Tennyson, C.M.G.

The first Bicentenary Medal, which, as recorded in the last Annual Report, was awarded to Sir Colin Anderson, was presented at the special meeting for the presentation of R.D.I. diplomas referred to in the preceding section.

VII. R. B. BENNETT EMPIRE PRIZE

On the unanimous recommendation of the Council and of the Commonwealth Section Committee of the Society, His Royal Highness The Duke of Edinburgh, as President of the Society, was graciously pleased to award the R. B. Bennett Empire Prize for 1954 to Dr. Chalmers Jack Mackenzie, C.M.G., M.C., F.R.S., late President of Atomic Energy of Canada, Limited, a Crown company, for his important work in the field of engineering and atomic research.

His Excellency Norman A. Robertson, High Commissioner for Canada, received the prize on behalf of Dr. Mackenzie at the Inaugural Meeting of the 201st Session on 3rd November, 1954.

VIII. ENDOWED PRIZES

Offers of prizes were this year made under the Benjamin Shaw, Fothergill and Howard Trusts. One prize of £10 and two prizes of £5 were awarded under the Fothergill Trust, but no award could be made of prizes offered under the two other trusts. Full details of the results of the offers were published on page 941 of volume 102 of the *Journal*.

A prize of £5 under the Aldred Trust was awarded on behalf of the Society by the City Literary Institute to Miss E. J. Phillips for an essay on 'Modern Developments in English Poetic Drama.'

IX. EXAMINATIONS

The table of subject entries which follows shows a very substantial increase over those for the previous year. The total of 178,429 entries constitutes a record, exceeding the total of last year, which at that time was a record, by 23,088.

	1954–55	1953–54
(*a*) Ordinary (Single-subject) Series	142,579	127,107
(*b*) Oral Tests	3,481	3,022
(*c*) School and Senior School Commercial Certificates ...	14,952	9,664
(*d*) Grouped Course	12,956	11,793
(*e*) Transport Scheme 'A'	—	20
Scheme 'B'	1,142	1,419
(*f*) Teacher's Certificate in Shorthand	652	648
(*g*) Teacher's Certificate in Typewriting	403	317
(*h*) British Transport Commission (Preliminary examination of candidates under Apprenticeship Schemes) ...	1,976	999
(*i*) British European Airways (Special proficiency tests in Shorthand and Typewriting)	128	199
(*j*) Royal Air Force Administrative Apprentices—scheme of endorsement of certificates awarded by the Air Ministry	160	153
	178,429	155,341

Deputation to the Ministry of Education

At the meeting of the Examinations Committee in July, 1954, there was a consensus of opinion that experience had proved that the examinations for the General Certificate of Education did not meet the requirements of all types of secondary schools, and especially those of Secondary Commercial, Secondary Technical and Secondary Modern schools. This matter was further considered by the Examinations General Purposes Sub-Committee and, on its recommendation, the Council submitted the following resolution to the Ministry of Education:

> The examinations of the Society, and of bodies of similar standing, are, in our opinion, appropriate to the needs of pupils in Secondary Modern, Secondary Technical and Secondary Commercial schools, including, in suitable cases, those between 15 and 16 years of age, and there is a strong case for allowing these pupils to be entered for such examinations by their schools and to have their fees paid by the local education or school authority.

In January last a deputation of the Council was received by officials of the Ministry, when this resolution was discussed in detail, but the outcome of the deputation is not yet known.*

Associate Membership

Three Silver Medallists in the Society's examinations in 1954 have been elected to Associate Membership.

Examinations in West Africa

The Summer Series of examinations is being held at a number of centres in

* On the morning following the Annual General Meeting official notification was received from the Ministry that the Minister had decided not to alter his policy at present.

Nigeria under the control of the West African Examinations Council. This year there are over 4,000 subject entries. In addition, 411 candidates have entered for the School Commercial Certificate and 298 for the Senior School Commercial Certificate examinations, for which they will work over 5,000 papers.

In addition, the West African Examinations Council has agreed to introduce and make itself responsible for the conduct of the Society's examinations in the Gold Coast, the first of which will be held there this autumn.

School and Senior School Commercial Certificate Examinations

Last year the regulations for these examinations, which are specially designed for day schools, were amended, and the minimum number of subjects for the award of the certificate was reduced from seven to five. This was welcomed by the schools, and the number of subject entries at the examinations has increased from 9,664 to 14,943.

Examinations in Road Transport Subjects

The number of candidates for Scheme 'B' (which is now the only scheme) of the Road Transport examinations has dropped from 1,419 in 1954 to 1,142 in 1955. This is disappointing, but it is hoped that the constant efforts of the National Committee on Road Transport Education to publicize the examinations will, in time, make the scheme better known to employees generally and will widen its support by employers in the industry.

Apprenticeship Schemes of British Transport Commission

For several years the Society has arranged special examinations for prospective traffic apprentices of British Railways. This year the scheme was extended to cover, in addition, the selection of railway accountancy apprentices, and also port apprentices for the Docks Division of the British Transport Commission. The three sets of candidates worked the same papers in English and Geography/General Knowledge, together with a special paper in their particular field of study, namely 'Railway Subjects—Commercial and Operating' or 'Railway Accounts and Statistics' or 'Port Operation and Administration'.

Other Examinations

Examinations in Arithmetic and English were held in November, 1954, and in March and July, 1955, in connection with the scheme of endorsement by the Society of certificates awarded by the Royal Air Force to their administrative apprentices.

The special examinations in Shorthand and Typewriting for the award of proficiency pay to employees of British European Airways were held in October, 1954, and April, 1955.

The Worshipful Company of Clothworkers has again generously contributed towards the cost of the silver and bronze medals.

A fuller report of the Society's examinations during the past year will be published in the *Journal* in the autumn.

X. INDUSTRIAL ART BURSARIES COMPETITION

The competition held during 1954 was divided into 13 sections, for the design of domestic electrical appliances, electric light fittings, domestic gas appliances, domestic solid-fuel-burning appliances, carpets, dress textiles, women's fashion wear, furnishing textiles, laminated plastics, 'Perspex' articles, footwear, furniture, and wall-paper, respectively; and one bursary of £200, twelve of £150, six of £75 and one of £50 have been awarded to successful candidates. The ten bursary winners who were eligible for the award of Associate Membership were elected at the March and April meetings of the Council.

Candidates were required both to undergo a set test carried out under invigilation, and also to submit with the work done in that test examples of work done by them in the ordinary course of their studies. An illustrated report of the competition was published, of which a summary was included in the *Journal* for the 4th March last, and the usual exhibition of winning and commended designs was held in the Society's House in May. In the autumn of 1954 the exhibition of the winning and commended designs submitted in the 1953 competition was shown at the Birmingham College of Arts and Crafts.

Twenty-five of the candidates successful in previous competitions made tours abroad during the year. Most of them visited Scandinavia, France or Italy, and other countries visited were Belgium, Greece, Holland, Norway, Switzerland, and Western Germany; a number of the candidates also undertook courses of study and visited various factories and studios in this country. Details of all these tours and courses were included in the report of the 1954 competition. Of the winning candidates in that competition, 12 have already begun their tours on the Continent; and the remainder will be setting out either later this year or in the spring of 1956. Arrangements have also been made for two of the commended candidates to gain practical experience by visiting factories in this country.

The Council wishes to express once again its appreciation of the generous donations from industrial bodies and firms which make this competition possible, and which encourage the Council and the Bursaries Board in their firm belief that the competition is of real service to industry, and to the cause of industrial design.

The Council has decided to organize a similar competition during the present year, and to offer bursaries of the total value of £2,600, of which £2,411 5*s*. has now been subscribed by industry, for the design of domestic electrical appliances, electric light fittings, domestic gas appliances, domestic solid-fuel-burning appliances, carpets, dress textiles, women's fashion wear, furnishing textiles, acrylic sheet ('Perspex') articles, laminated plastics, P.V.C. plastics sheeting, footwear, furniture, jewellery and wall-paper. An announcement of the 1955 competition was published in the *Journal* for 27th May.

XI. THOMAS GRAY MEMORIAL TRUST

Prizes for Ships' Apprentices

Fifteen prizes of a total value of £70 19*s*. 5*d*. were awarded in connection

with the examinations conducted by the Merchant Navy Training Board. The prizes consisted of five silver medals, five bronze medals and five nautical instruments.

Scholarships for Deck-Boys and Young Seamen

In 1954 the Trust made a grant of £50 towards the provision of scholarships for deck-boys and young seamen, which are mainly financed by the Trust but administered by the Seafarers' Education Service, and 18 scholarships were awarded.

Training Ship Prizes

Prizes, to a total value of £30, offered to the training ships *Indefatigable*, *Arethusa* and *Mercury* for the boy in each ship who, in the opinion of his officers, would make the best sailor, were awarded to Edward Peter Williams of *Indefatigable* (£10), Christopher Jameson and John Hills of *Arethusa* (£5 each), and R.C.M. Baker of *Mercury* (£10). The silver medal offered as a navigation prize in the South African Nautical College *General Botha* was awarded to Bryan Lawrence.

Extra Master's Certificate Examinations

The Silver Medal offered to the candidate who obtained the highest marks in the Ministry of Transport's Examinations for the Extra Master's Certificate in 1954 has been awarded to Mr. John Herbert Witty.

Thomas Gray Memorial Bursaries Scheme

Three bursaries were awarded in 1954 under the Thomas Gray Memorial Bursaries Scheme to cadets from the School of Navigation, Southampton, H.M.S. *Conway* and H.M.S. *Worcester* respectively.

Deed of Professional Merit

Only one submission was received in connection with the offer of an award of £50 for a deed of outstanding professional merit performed by a member of the British Mercantile Marine between October, 1953, and September, 1954, and the judges felt unable to recommend this submission for the award.

XII. THE SOCIETY'S BICENTENARY

The earlier celebrations of the Society's Bicentenary were included in the last Annual Report, but the following belong to the period now under review.

(*a*) *Fellows' Soirée.* An informal evening reception for Fellows and their guests was held at the Society's House on Wednesday, 30th June, 1954, at which there was a performance of cinematographic and sound recordings of several of the Bicentenary functions and a further opportunity was given for Fellows to examine the Addresses of Congratulation which were presented to the Society in March of that year.

(*b*) *Visit to Longford Castle.* By the kind invitation of the Earl of Radnor (Chairman of Council, July, 1953 to July, 1954) and the Countess of Radnor, a large party of Fellows and members of the staff and their ladies visited Longford Castle, near Salisbury, on 3rd July, 1954. Longford Castle is not only the seat of the then Chairman of Council but was also the home of Lord Radnor's ancestor, Jacob, Viscount Folkestone, the Society's first President. (A detailed account of this very happy function was published on pages 695–6 of volume 102 of the *Journal*.)

(*c*) *Reception at St. James's Palace.* The final function in this country in celebration of the Society's Bicentenary was an evening reception held, by gracious permission of Her Majesty The Queen, at St. James's Palace on Wednesday, 15th December, and attended, as mentioned above, by His Royal Highness the President. About 1,000 guests were present, including the presidents of a number of kindred societies. A list of those who were presented to His Royal Highness, together with a detailed account of the whole function, was published in the *Journal* for the 24th December.

(*d*) *Bicentenary Competition.* The Society's offer of prizes totalling £500 for forecasts of the practical aspects of life on the earth in the year 2000 aroused great interest, both in this and other countries, but the standard of the 184 entries submitted was disappointing and the Council, on the recommendation of the judges, was only able to award five of the lesser prizes. The two entries which were adjudged to be the best were, as it happened, both concerned with the subject of transport and were read to the Society at the Ordinary Meeting on 24th November. A full report on the competition, with the text of these two and other entries, was published in the *Journal* for the 10th December.

(*e*) *Canadian Celebration.* A banquet in honour of the Society's Bicentenary was held in Toronto on Saturday, 19th February, 1955. Over 100 guests were present, many of them having travelled great distances for this first function of the Royal Society of Arts in the Dominion. In response to an invitation from the organizers that the Society's headquarters should be represented, the Council decided that the Secretary should attend. A full report was published in the *Journal* for 1st April.

(*f*) *Portrait of Lord Radnor.* Professor Rodrigo Moynihan, C.B.E., A.R.A., has been commissioned to paint a portrait of the Earl of Radnor, as a commemoration of the Society's Bicentenary.

XIII. SPECIAL ACTIVITIES COMMITTEE

In keeping with the demand for a progressive future which was made by the President when he addressed the Society at the Inaugural Meeting of the Bicentenary session, the Council has appointed a new standing committee, called the Special Activities Committee, with the responsibility of considering and advising the Council upon proposals for useful new action by the Society in matters of public interest. The chairman is Mr. A. R. N. Roberts.

This committee has, since its appointment, given very careful consideration

to a number of proposals, some of which have led to private and informal action, but the first important result of its labours is the organization of a representative conference which, with the support of other national bodies interested in the subject, is to be convened in the autumn at the Society's House to discuss the subject of 'Overseas Market Research—fact-finding as a practical aid to export sales'.

Further suggestions from Fellows of the Society will, of course, be welcomed by the committee, which will be very glad to study every proposal for appropriate action by the Society. It will, however, be understood that its responsibility is largely selective and that it must advise the Council on what it considers to be the most useful objects towards which the Society may devote its attention. It is, of course, the Council which must take the ultimate decision in each case.

XIV. EVENING DISCUSSION MEETINGS

As the result of a suggestion by a Fellow, Mr. F. S. Height, the Council decided to arrange as an experiment a series of informal evening discussion meetings, and three meetings were held in the Library on 20th January, 17th February and 17th March respectively, under the supervision of the Special Activities Committee.

The Society was fortunate in having distinguished speakers to open each discussion. At the first meeting, Mrs. Mary Adams, O.B.E., Director of Television Talks Features, B.B.C., introduced the subject of 'Television—Friend or Foe'; at the second, Miss Margaret Miles, B.A., Headmistress of Mayfield School, (Putney County Comprehensive School), introduced the subject of 'Equality of Education, with special reference to Comprehensive Schools'; and at the last meeting Mr. John Gloag was the opening speaker on 'The Future of Shop Design and Window Display'.

The primary object of the meetings, however, has been to provide an opportunity for informal discussion, particularly by younger members of the Society, many of whom are not able to attend Ordinary Meetings in the afternoon, and even when able to do so are diffident about speaking on such an occasion. Though the attendances at the three meetings so far held have been encouraging, the number of younger members of the Society in the audience has been somewhat disappointing. The Council, however, has decided to continue the experiment for another session and it very much hopes that these meetings will be regarded by the younger Fellows as providing them with a valuable opportunity of participating in the Society's work.

XV. OVERSEAS MARKET RESEARCH ESSAY COMPETITION

In view of the importance to the economic future of Great Britain of the country's ability to compete successfully in overseas markets, the Society and the British Export Trade Research Organisation have organized jointly an essay competition for the award of a grant of £500 to enable the successful candidate

to study marketing conditions at first-hand in an overseas country. The closing date for the receipt of entries for this competition is 1st September, 1955.

XVI. EXHIBITION OF EUROPEAN MEDALS, 1930–1955

An exhibition of medals from West European countries, designed and made during the past quarter of a century, was held in the Library from 8th June to the 29th, and was organized by the Society in association with the Royal Numismatic Society and La Fédération Internationale des Éditeurs de Médailles, to whom the Society is greatly indebted for their willing and energetic co-operation, as well as to the Director of the Paris Mint and the Deputy Keeper of the Royal Mint, London, for the special exhibits which they respectively prepared and lent. This exhibition appears to be the first of its kind in this country, or at least the first for a great many years, and it is hoped that it will do much to stimulate an interest in an important art which has long been neglected in this country. Some 300 medals were shown and a number of coins were also included in the display.

The Exhibition was opened on 8th June by Professor A. E. Richardson, President of the Royal Academy, and a Member of Council of the Society, and papers were read on the subject of the Exhibition by Dr. C. H. V. Sutherland and M. Jean Babelon, on 8th June and 28th June respectively. The Exhibition was very well received by the Press, and, considering its unfamiliar and specialized nature, the attendances of the general public were most encouraging.

In connection with this Exhibition, the Deputy Master of the Mint kindly offered Fellows and visitors to the Exhibition special facilities for visiting the Royal Mint. A number of parties were arranged as a result.

XVII. OFFICIAL VISITS OVERSEAS

The past year has been remarkable for the number of overseas visits paid by representatives of the Society's headquarters. Several visits by the Chairman of Council are recorded above, and Sir Alfred Bossom, one of the Treasurers, has been in South Africa and met several Fellows of the Society there.

The Secretary also, after attending the Bicentenary Banquet in Toronto, took the opportunity while in North America to visit a number of cities in Eastern Canada and the United States, where opportunities were kindly arranged for him to meet Fellows of the Society and others who might be interested in its work.

XVIII. FILM EVENINGS

Film Evenings have continued to be very popular. Four programmes were arranged during the session and the attendances on all occasions were very good. As has been the custom since these programmes commenced, in most cases the producers or directors were present to introduce their films.

The programmes included *The Story of Fine China*, *They Planted a Stone*, *The Power to Fly*, *Forest Heritage*, *The Culbin Story*, *Back of Beyond* (Australia), *Corral* (Canada) and *Tom Schuler* (U.S.A.)

XIX. SCIENCE AND INDUSTRY COMMITTEE

The Science and Industry Committee, sponsored jointly by the Society, the British Association and the Nuffield Foundation, is actively pursuing its investigations into the possibility of speeding up the application to industry of the results of scientific research.

The committee's work is centred on two research units: one, at the Queen's University of Belfast, which is directed by Professor C. F. Carter, the chairman of the committee, is carrying out a survey of the research already under way elsewhere, and the other, at the University College of North Staffordshire, which is directed by Professor B. R. Williams, is collecting its own evidence at first-hand by interviews with representative manufacturing firms.

During the year the Government, which initially made the work of the committee possible by making a grant from Conditional Aid Funds, has added substantially to its financial support in order to make possible some enlargement of its investigations and the consequent engagement of additional research workers.

XX. COLLABORATION WITH OTHER ORGANIZATIONS

During the year the Council has very willingly collaborated with other organizations, and in some cases made small grants, in the following matters: the erection of a memorial to John Nash at All Souls' Church, Langham Place; the entertainment of a large party of members of the American Institute of Decorators; the arrangements for the forthcoming Franklin 250th Anniversary Celebrations, the Perkin Centenary Celebrations and the McKnight Kauffer Memorial Exhibition; the provision of a British exhibit at the Swedish Exhibition of Industrial Design at Hälsingborg; and the establishment of a United Kingdom Committee for the World Health Organization of the United Nations.

XXI. LIBRARY

The archivist is continuing his work on the Society's papers, and it is hoped that all those dated before 1850 will be catalogued and available to students by next year. The Library has benefited from a number of gifts during the year; these included three made on the occasion of the Society's Bicentenary: Branting and Lindblom's *Medieval Embroideries and Textiles in Sweden*, Hald and Skawonius, *Contemporary Swedish Design*, and Taullard's *Plateria Sudamericana*. In addition, the first volume of *A History of Technology*, edited by Dr. Singer, has been presented to the Library, and the succeeding volumes will be added as published.

It has also been possible to add to the Society's collection of eighteenth century books on design, science and technology and to have some of these books, and some of its early minutes, rebound.

XXII. THE SOCIETY'S CHRISTMAS CARD

The production of a special Christmas card for the use of Fellows has now become a regular undertaking, and judging by the fact that nearly 20,000 were sold last year, it is clear that this is a service appreciated by Fellows.

The subject of the card of which this record number was sold was the first meeting of the Society at Rawthmell's Coffee House in London in 1754, the artist being Miss Anna Zinkeisen, R.O.I., R.D.I.

XXIII. THE SOCIETY'S HOUSE

Considerable re-decoration of offices and other parts of the building used for official purposes was carried out in the summer of 1954, and this, with some minor repairs to be effected during the present summer, will complete the repair of the war damage sustained by the building 14 years ago.

XXIV. FELLOWSHIP

As befitted a time of celebration, the membership of the Society has continued to increase during the year, and the number of Fellows on the roll after the June meeting of Council was 6,216, which is an increase of 117 over the total at the same time last year. This sign of appreciation of the Society's work is a source of satisfaction to the Council and has encouraged it to develop the more active policy reflected in the present report.

While it looks forward to a continuation of the same trend in the United Kingdom it hopes particularly that the Society's membership may continue to increase overseas, for it feels that the Society's fellowship can play an increasingly valuable part as a cultural link between the nations of the British Commonwealth and of the world at the present time.

The Membership Committee meets regularly to examine carefully all applications for membership of the Society and Fellows are invited to submit for consideration the names of suitable candidates.

XXV. OBITUARY

During the past year the Society has unhappily lost by death a number of Fellows who had been active in its service as members of its Council. Among these was a Vice-President of the Society, Mr. John A. Milne, who had been a member of Council since 1929 and whose outstanding work as its Chairman had been marked by his re-election to that office for a third year. He was subsequently awarded the Albert Medal for his eminent services to industrial design, mainly through the instrumentality of the Society. Four former members of Council, Sir Wallace Akers, Lieut.-Colonel P. A. Cowan, Mr. Geoffrey Holme and Sir Henry Steward, have also died during the past 12 months.

Among other obituary notices published in the *Journal* were those of Mr. George Cadbury, Major F. B. Halford, Sir Roderic Hill, Lady MacRobert, Sir Alexander Fleming, an Albert Medallist, and Mr. E. McKnight Kauffer, who was included in the first list of appointments to the R.D.I. distinction in 1936.

XXVI. BEQUESTS

The Council has received with gratitude during the year generous bequests from the late Mrs. Grace Cook (£1,000), the late Mr. J. A. Milne (£500) and

the late Lieut.-Colonel P. J. Cowan (£200). In order that an appropriate record may be preserved of all bequests to the Society, the Council has decided to institute a special book in which all such gifts (only the larger of which can be inscribed on the panels in the Entrance Hall) should be recorded. The moneys themselves, unless bequeathed for special purposes, will be paid into a special Legacies Fund, which it is hoped to build up into a substantial endowment of the Society's activities, although it will not constitute a formal trust.

XXVII. NEW COUNCIL

The Society's Council for the year 1955–56 will be the first to be elected under the Bye-laws as amended at the Annual General Meeting in June, 1954. Before these changes the Balloting List contained the names of 24 Vice-Presidents and 12 'Ordinary Members of Council', these offices being virtually identical except in name. The list to be presented at the present year's Annual General Meeting contains a much shorter list of Vice-Presidents, which consists of the five past-Chairmen of Council, the present Chairman, Mr. E. Munro Runtz, and the Chairman-designate, Dr. R. W. Holland, together with the new Master of the Faculty of Royal Designers for Industry, Mr. Milner Gray. The remaining 24 nominees are all to be elected as 'Ordinary Members of the Council'.

In view of the consequent reduction in the size of the Council, the number of Vice-Presidents and Ordinary Members of the present Council who retire under the Bye-laws is greater than usual. They are: Sir Frank Brown, Sir Charles Dodds, Sir John Forsdyke, Dame Caroline Haslett, Mr. E. M. Rich, Sir Gordon Russell and Sir Francis Meynell. In addition, Sir Andrew Rowell is unable to stand for re-election.

It is recommended that the vacancies available for 'Ordinary Members of the Council' (which, for the reason mentioned above, is less than the number of retirements) should be filled by Dr. Greenhouse Allt, Lord Horder and Miss Anna Zinkeisen.

XXVIII. STAFF

Owing to the recent considerable increase in the Society's activities the Council decided to institute a new post of Deputy Secretary. The Assistant Secretary, Mr. R. V. C. Cleveland-Stevens, was promoted to this new appointment and has been succeeded as Assistant Secretary by Mr. D. Lea.

In July last presentations were made to the following members of the staff who had been in the Society's service for 25 years or more: Messrs. C. Elton; H. J. Baker; J. H. Flanders: F. A. Wheeler; A. G. Barnes; J. Samson: G. A. Nicholls, and I. Jacobs. A similar presentation was made in January to Mr. W. T. Tuck, and it is intended that this shall in future be the regular practice.

XXIX. FINANCE

The Accounts for 1954 show an excess of income over expenditure amounting to £2,274, which is particularly satisfactory in view of the heavy expenditure incurred during the year on account of the Bicentenary celebrations. The

Council consider, however, that it is important to maintain the Society's income at the present or even at an increased level, partly because the regular expenses are still increasing from year to year as costs rise (for example, the amount needed for salaries will, owing to increments, advance very substantially over the next few years), and also because, as is apparent from the present report, the Council are fully carrying out the intention which they declared a year ago of leading the Society into a generally more active policy, and this is inevitably involving an increase of expenditure.

For this reason the Council feels it to be essential that the Society should each year have a surplus over the amount required for its regular commitments, to enable it to undertake the special activities which its unique *rôle* as an ancient and unspecialized body fits it to undertake from time to time.

XXX. STANDING COMMITTEES

A list of those appointed to serve on the various standing committees of the Society, and of the Society's representatives on the governing bodies and committees of certain other organizations, was published in the *Journal* for the 26th November, 1954.

XXXI. PAPERS AND LECTURES

The programme of papers and lectures during the Session was as varied as usual and the attendances, with few exceptions, have been very good.

The Society was again honoured, on two occasions, by having as its lecturer a distinguished foreigner who had travelled to this country specially in order to speak before it, namely, Ir. F. Q. den Hollander, President of the Netherlands Railways, who spoke on '*The Reconstruction of the Dutch Railways*', and M. Jean Babelon, Conservateur-en-chef du Cabinet des Médailles, Paris, who lectured on '*The Medal in Art and Society*' at the close of the Exhibition of European Medals.

A. ORDINARY MEETINGS

Chairman's Inaugural Address

LOOKING AHEAD. *E. Munro Runtz* (page 18)

Trueman Wood Lecture

NEW WAYS OF FLYING. *Major Oliver Stewart* (page 626)

Peter Le Neve Foster Lecture

THE DETECTION AND PREVENTION OF ANTI-SOCIAL BEHAVIOUR IN YOUNG PERSONS. *Sir Basil Henriques* (page 452)

Alfred Bossom Lecture

ENGLISH CHURCH ARCHITECTURE. *A. B. Knapp-Fisher* (16th March)

E. Frankland Armstrong Memorial Lecture

SCIENCE AND FOOD PRODUCTION. *Dr. Leslie H. Lampitt* (page 99)

Pope Memorial Lecture

SOME RECENT DEVELOPMENTS IN THE CHEMISTRY OF NUCLEIC ACIDS. *Sir Alexander Todd* (18th May)

Cadman Memorial Lecture

RESEARCH IN THE COAL INDUSTRY. *Dr. W. Idris Jones* (page 234)

Llewelyn B. Atkinson Memorial Lecture

THE INSULATION OF SUBMARINE TELEPHONE CABLE. *J. N. Dean* (page 151)

Fernhurst Lecture

VIRUS DISEASES OF PLANTS. *F. C. Bawden* (page 436)

Percy Smith Memorial Lecture

PUBLIC LETTERING. *Christian Barman* (page 281)

Papers

Special Meeting

(Presentation of R.D.I. Diplomas and the Bicentenary Medal.) Oration

THE SEEING EYE. *Sir Francis Meynell* (page 8)

Ordinary Meetings

THE PLACE OF THE FILM IN THE AGE OF TELEVISION. *Dr. Roger Manvell* (page 75)

A SCHEME FOR ROOF-TOP ROADWAYS. *Wing Commander T. R. Cave-Brown-Cave* (page 36)

A SYSTEM OF UNDERGROUND ROADWAYS FOR LONDON. *C. E. H. Watson* (page 44)

THE BUYING AND SELLING OF ANTIQUES. *Cecil F. Turner* (page 168)

THE CHALON PORTRAIT. *Robson Lowe* (page 342)

THE RECONSTRUCTION OF THE DUTCH RAILWAYS. *Ir. F. Q. den Hollander* (page 263)

WELFARE IN A LARGE FAMILY FIRM. *The Honble. H. A. Cozens-Hardy* (page 352)

BUSINESS AS PATRON OF THE ARTS IN THE INDUSTRIAL AGE. *F. C. Hooper* (page 413)

THE BEAUTY OF STAINED GLASS. *Carl Edwards* (page 591)

RADIO ASTRONOMY. *Professor A. C. B. Lovell* (23rd March)

RECENT DEVELOPMENTS IN DEEP SEA DIVING. *Sir Robert Davis* (page 555)

THE PLANNING OF ROADS. *E. W. H. Vallis* (11th May)

THE ART OF THE MODERN MEDAL. *Dr. C. H. V. Sutherland* (page 541)

THE MEDAL IN ART AND SOCIETY. *Jean Babelon* (28th June)

B. COMMONWEALTH SECTION

Nine papers and lectures were delivered to the Commonwealth Section during the Session.

Sir George Birdwood Memorial Lecture

CHANDIGARH AND PLANNING DEVELOPMENT IN INDIA. *E. Maxwell Fry and Miss Jane Drew* (page 315)

Thomas Holland Memorial Lecture

SCIENTIFIC RESEARCH IN INDIA. *Sir Alfred Egerton* (19th May)

Henry Morley Lecture

THE COPPERBELT OF NORTHERN RHODESIA. *R. L. Prain* (page 196)

Papers

THE DEVELOPMENT OF BROADCASTING IN BRITISH AFRICA. *J. Grenfell Williams* (page 113)

MUSIC IN AFRICA. *S. Hylton Edwards* (24th February)

ANTHROPOLOGY IN CENTRAL AFRICA. *Professor Max Gluckman* (3rd March)

POST-WAR CHANGES IN AFRICA. *Lord Hailey* (page 579)

THE COMMONWEALTH AS A SOURCE OF ESSENTIAL OILS. *M. F. Carroll* (28th April)

RECENT TRENDS IN COLONIAL ECONOMIC DEVELOPMENT. *Sir Hilton Poynton* (5th May)

C. CANTOR LECTURES

The following courses were delivered during last Session:

SOME ASPECTS OF MUSIC:

Music in Education. *Dr. W. Greenhouse Allt* (page 373)

Music in the Theatre. *Leslie Bridgewater* (page 386)

Music in Medicine. *Frank Howes* (page 398)

THE MECHANICAL PROPERTIES OF METALS:

The Tensile Properties of Metals. *Professor Hugh Ford* (page 471)

Creep. *Professor E. N. da C. Andrade* (page 487)

Fatigue. *Major P. L. Teed* (page 503)

STONE IN ARCHITECTURE:

Stone as a Building Material. *R. J. Schaffer* (2nd May)

The Weathering, Preservation and Restoration of Stone Buildings. *R. J. Schaffer* (9th May)

The Stonemason's Craft. *W. F. Haslop* (16th May)

D. DR. MANN JUVENILE LECTURES

Two Juvenile Lectures were given during the Christmas holidays as follows:

SPIES IN FACT AND FICTION. *Bernard Newman* (page 131)

SOME MYSTERIES OF METALS. *Professor E. N. da C. Andrade.* (page 189)

XXXII. MEDALS FOR PAPERS

The Council have awarded Silver Medals for the Session 1954–1955 to the following lecturers:

For Papers read at Ordinary Meetings

Ir. F. Q. den Hollander

F. C. Hooper

Professor A. C. B. Lovell

Sir Robert H. Davis

Dr. C. H. V. Sutherland

Jean Babelon

For Papers read at Meetings of the Commonwealth Section

The late J. Grenfell Williams

Professor Max Gluckman

Sir Hilton Poynton

The Chairman then invited questions on the Annual Report and there being none formally moved its adoption. Sir Alfred Bossom having formally seconded the adoption of the Report, the motion that it should be adopted was put to the meeting and carried unanimously.

The Chairman then called on Mr. P. A. Le Neve Foster, the Senior Treasurer, to move the adoption of the Accounts for the year ending 31st December, 1954.

MR. LE NEVE FOSTER The Accounts have been published in the *Journal* and commented on in the Annual Report and there is not very much to say about them. We have a surplus of income over expenditure of £2,274 and we have that surplus after paying out £3,681 for the Bicentenary celebrations.

Looking forward, we shall have, in the next year's Accounts, some further amounts to pay in connection with the Bicentenary. We shall also have increased salaries to pay and I think that it is probable that the Special Activities Committee may come along and want money to spend, so that it is important that we should carry a surplus forward.

The Society is in a very healthy state financially, and we shall have money available to do anything that the Special Activities Committee are likely to want and to meet any salary increases that become necessary. I would now like formally to move the adoption of the Accounts.

Lord Nathan having formally seconded their adoption, the motion that the Accounts be adopted was put to the meeting and carried unanimously.

The list of nominations having been exhibited in the Library in accordance with the Bye-Laws, and no additional nominations having been made, the Chairman called on the Secretary to announce the new Council for 1955–56, *which was done as follows.* (*Names in italics are of Fellows who have not served on the previous Council.*)

PRESIDENT

His Royal Highness The Duke of Edinburgh, K.G.

VICE-PRESIDENTS

Sir Atul Chatterjee, G.C.I.E., K.C.S.I.
Sir Edward Crowe, K.C.M.G.
Sir Ernest Goodale, C.B.E., M.C.
Robert W. Holland, O.B.E., M.A., M.Sc., LL.D. (*Chairman-designate*).
Sir Harry Lindsay, K.C.I.E., C.B.E.
The Earl of Radnor, K.C.V.O.
E. Munro Runtz, F.R.I.C.S.
Milner Gray (*Master of the Faculty of Royal Designers for Industry*).

ORDINARY MEMBERS OF COUNCIL

W. Greenhouse Allt, Mus.D.
F. H. Andrews, O.B.E.
Robin Darwin, C.B.E., Hon.A.R.C.A.
John Gloag, Hon.A.R.I.B.A.
The Earl of Halsbury, F.R.I.C., F.Inst.P.
A. C. Hartley, C.B.E., B.Sc., F.C.G.I., M.I.C.E., M.I.Mech.E.
Lord Horder, G.C.V.O., M.D., F.R.C.P.
William Johnstone, O.B.E., D.A.
Lord Latham, J.P.
F. A. Mercer.

Oswald P. Milne, F.R.I.B.A.
Lord Nathan, P.C., T.D., D.L., J.P.
Sir William Ogg, M.A., Ph.D., LL.D.
Professor A. E. Richardson, P.R.A., F.R.I.B.A.
A. R. N. Roberts.
Sir Harold Saunders, F.C.G.I., B.Sc.(Eng.)
Sir Selwyn Selwyn-Clarke, K.B.E., C.M.G., M.C., M.D.
Sir John Simonsen, D.Sc., F.R.I.C., F.R.S.
Professor L. Dudley Stamp, C.B.E., D.Lit., D.Sc.
Sir Stephen Tallents, K.C.M.G., C.B., C.B.E.
William Will, C.B.E.
Sir Griffith Williams, K.B.E., C.B.
John G. Wilson, C.B.E.
Miss Anna Zinkeisen, R.O.I., R.D.I.

TREASURERS

Sir Alfred Bossom, Bt., F.R.I.B.A., J.P., M.P.
P. A. Le Neve Foster.

THE CHAIRMAN: It is my privilege and my pleasure now to propose a vote of thanks to our devoted staff. The staff means our Secretary, his band of brothers and sisters, including our Headquarters staff, our Examinations office staff and our Printing Department.

I may say that my Council is fully aware of its good fortune in being so well served. I have served on the Council for some 15 years now, and never has the staff failed to come up to scratch. Indeed, much more than that, recently owing to the railway strike they were put to very great inconvenience. Many of them had to stay in London. Did they fail? Not for a moment! They worked overtime to overcome these difficulties, and those difficulties particularly applied to our Examinations Department because they were faced with the almost impossible task of sending our Examinations papers out due to the Post Office restrictions on the weight on parcels. However, luckily the strike ended and all is well. I personally have great admiration for our staff and I formally propose this vote of thanks to them all.

The vote of thanks was carried unanimously.

THE SECRETARY: Mr. Chairman, it is my privilege again to thank you most sincerely for the extremely kind words in which you have proposed this vote of thanks and to thank the Members of Council and of the Society for the way in which they have received your proposal. You were good enough to speak of the Society's good fortune in having its staff. I would like to repeat what I have said on many similar occasions that I myself, and I think all of my colleagues, do most sincerely consider that we have the utmost good fortune to have been selected to serve such a Society and to have our life's work, in some cases, in such a setting as this. Your words to-day are a great encouragement to us because we know not only from what you say in public but also from what you say in private how much you mean them, and I should also like to take this opportunity of saying 'thank you' for a recent very practical sign of the Council's appreciation of our work. Both the Report, and the Senior Treasurer in his speech have referred more than once to 'salaries'. We have been very generously treated again recently in this matter and I have been asked by my colleagues to say,

and I should like to say for myself, how much we appreciate the increases granted to us both for their own sake and for what they betoken. Thank you very much.

SIR ERNEST GOODALE, C.B.E., M.C.: My Lords Ladies and Gentlemen as the most immediate past-Chairman here present to-day it is my privilege and opportunity to propose to you a very warm vote of thanks to our Chairman for the way in which he has conducted the affairs of the Society from the Chair in the last 12 months. Mr. Runtz, who was Chairman two years ago, very generously and humbly stood down for a year so that the immediate descendant of our first President might take the chair during our Bicentenary year. But it is usual for the chair to be occupied for two years running and we were very glad when Mr. Runtz agreed to occupy the chair for his second year. He has done yeoman service for us this year and we are very grateful to him, because during that time he has suffered great pain from time to time and has overcome that in the most remarkable way in order to be present as much as possible when duty called.

The Report refers to the three overseas visits which he has made this year to repay visits of kindred societies from overseas during our Bicentenary celebrations. He has done that often at great inconvenience and we are very greatful to him because it has cemented relationships with those bodies and again advanced the work of the Society. Lastly, I am sure he would not wish me to forget, in passing this vote of thanks to him, the devotion of his wife in helping him to bear the burden during this last year. It gives me very great pleasure to propose a vote of thanks to our Chairman.

DR. R. W. HOLLAND, O.B.E., M.A.: Sir Ernest Goodale, My Lords, Ladies and Gentlemen, may I have the privilege of seconding that proposal, and rather than embarrass my good friend any further I will just do it formally, as he himself knows that that formal seconding has much more in it than would appear on the surface. May I second the proposal made by Sir Ernest Goodale?

The vote of thanks to the Chairman was carried with acclamation.

THE CHAIRMAN: Sir Ernest, Dr. Holland, My Lords, Ladies and Gentlemen, hard-bitten as I am I feel almost inclined to blush, bearing in mind what Sir Ernest has said. Particularly am I grateful to him for his reference to my wife, because without her help I could not possibly have done the journeys abroad.

I intend to say very little this afternoon, and indeed will confine myself to an appeal to manufacturers to give more and more financial support to the Society's Bursaries Competition so that those who win may be enabled to travel abroad and learn what other people think and design. I perhaps realize that we as a nation have so much to appreciate abroad and that there is much to educate us. Art should know no national barriers but provide a friendly, common ground for competition in our efforts towards an ideal.

Now I wish great success to Dr. Holland during his term of office and assure him of my support in his responsible position. Thank you.

The meeting then ended and tea was served in the Library.

NEW WAYS OF FLYING

The Trueman Wood Lecture

by

MAJOR OLIVER STEWART, M.C., A.F.C.,
Editor of Aeronautics

delivered to the Society on Wednesday, 4th May, 1955
with E. Munro Runtz, Chairman of Council of the Society, in the Chair.

THE CHAIRMAN: It is my privilege this afternoon to introduce to you Major Oliver Stewart. His position and his experience need no comment from me. I am, however, perturbed at the title of his lecture '*New Ways of Flying*', because in 1915, when I was on leave, I found the old ways exciting enough. I was having lunch at the local golf club, when one of my friends said, 'I bet you, Runtz, you wouldn't loop the loop if you had the chance'. I foolishly said I would. He said, 'Good, I know a pilot who will do it for you this afternoon. I will take you over'. So he did. Luckily the pilot was not on duty that day but they found a sergeant; they put me in an old biplane and instructed the sergeant to do all he could to make me sick. Luckily I survived, and I will stand no longer between you and the lecturer.

The following lecture, which was illustrated with a film and lantern slides, was then delivered:

THE LECTURE

My subject is the application of powered lift to flying machines and the new kinds of air vehicle to which it may lead. Power is used to obtain lift in conventional aeroplanes, but it is used indirectly. Power may also be used directly for obtaining lift and this direct use is closely related to the gas turbine and especially to turbojet, ducted fan and by-pass engines.

I propose to refer to some of the latest achievements in the application of powered lift, and to show where interesting correspondences can be found. I must emphasise that I do this as an observer. The only people competent to deal with the technical details of these extraordinary new devices are their designers themselves. I must also emphasize that there are researches into new kinds of flying machines which differ from those I shall describe, but to which I am not allowed to refer. I have sought permission, but not obtained it.

We have had fixed wing air vehicles without engines for over 150 years. Cayley's model glider was made in 1804. Now we have an engined air vehicle without fixed wings: the Rolls-Royce thrust measuring rig or 'flying bedstead'. We also have a new and closer partnership between fixed wings and engines: the Bell VTOL. The gas turbine has uncovered a relationship not clearly perceived before; it has shown that wing systems and power plant systems are radically the same: they are both devices for modifying the flow of gases. A wing system is a fluid flow apparatus; a gas turbine is a fluid flow apparatus. We seem to be moving towards a novel integration of external fixed wings and internal moving wings—for the turbine and compressor blades are wings of a kind—towards a single, indivisible gas flow apparatus.

It will be convenient first to look at the two main types of flying machine.

Out of the dozen aircraft types listed in the British Standard Glossary[1], the fixed wing aeroplane and the rotating wing aircraft or helicopter are the only ones in ordinary use. Both use engine power to contrive a relative flow of air over wings—for rotor blades as well as turbine blades are wings. Both meet Sir George Cayley's definition of mechanical flight, in that they both 'make a surface support a given weight by the application of power to the resistance of the air'.[2]

The fixed wing aeroplane with reciprocating engine applies power to the resistance of the air through intermediaries, first the moving wings or airscrews or 'rotative wafts'—to quote Cayley again—and, second through the fixed wings. It applies power indirectly through these two sets of wings. The first —the airscrew—converts shaft torque into thrust, and gives the aircraft translational motion, and the second set obtains a reaction from the relative airstream and gives lift.

In the helicopter, power is used for the same ultimate purpose, but without necessarily giving the whole aircraft translational motion. An intermediate stage between power and lift is leapfrogged. The 'rotative waft' becomes the lifting wing system as well as the propelling wing system.

Scrutiny of the differences between the transport capabilities of these two kinds of aircraft, aeroplane and helicopter, enables a glimpse to be had of the reason for the vast effort now being applied to devising new means for exerting power more directly to obtain lift. Let me set the cardinal qualities of the two types of machine in contrast. The aeroplane is good at high speeds, but bad at low. The helicopter is good at low speeds, but bad at high.

All aircraft operators, and most aircraft users, would dearly like to combine the landing and taking-off powers of the helicopter with the top-speed and economical cruising powers of the fixed wing aeroplane. In March, Sir Sydney Camm reminded us that this desire for improved speed range was expressed even before Louis Blériot flew across the English Channel in 1909.[3] Higher top speeds have made the need for improved speed range more compelling. Aeroplanes are becoming more exigent in their demands for runway length. To meet the International Civil Aviation Organization's start-stop condition—a condition which determines runway length—a Stratocruiser needs 1,900 metres (2,080 yards), a Douglas DC7 1945 metres and a Comet 2,200 metres.[4] The only useful comment on a runway over two kilometres long, is that it is too long. Sir Arnold Hall has recently scolded us for complaining about the length of runways. 'On economic argument', he said in his Brancker Memorial Lecture, 'it would be folly to penalize the efficiency of the aircraft as a flying machine in order to save a little on airport costs'.[5]

If the user paid, that might be accepted. But Henri Bouché has estimated that out of the £166 million a year paid for maintaining the world's airports and their navigation and other services, only one-fifth is paid by carriers.[6] Against these figures, the total number of air passengers in the year—about fifty million—is pitifully small. Nor are the disadvantages of long runways only financial. People living in the Gatwick area and probably other areas in the future

are going to see much pleasant countryside ruined, so that aeroplanes may continue their lunatic ground runs. And there is danger in the taking-off, approach and landing procedures associated with long runways. Too much is asked of the visual judgment and manual dexterity of the pilot, who must make a tangential landing with forty or fifty tons of assorted machinery going at 200 kilometres an hour.

So with respect to Professor Hall's view, I think that the aeroplane would be a safer, a more useful, and a more honest transport vehicle if, while retaining its high-speed powers, it could be operated from shorter runways. There is a real need to improve the aeroplane's low-speed performance or the helicopter's high-speed performance. Let the helicopter be considered first.

(To prevent misunderstanding I must here say that I believe aviation ought to give up the horribly muddled measures it now uses and go over to the rational and efficient metric system. Nautical miles and knots are bad units of measurement. I prefer kilometres and kilometres an hour.)

The coming of the gas turbine enabled fixed wing aircraft to make a large stride forward in speed; but not so the helicopter. In 1948 an official speed record for helicopters was set by a Fairey Gyrodyne with piston engine. To-day, seven years later, the official record, set by a Sikorsky S-59 with Turboméca Artouste gas turbine is only 53 kilometres an hour better. It is 251 kilometres an hour (156 miles an hour). Compare this with the fixed wing aeroplane record. It is 1215 kilometres an hour (755 miles an hour, or 656 knots). The gap is enormous. The fixed wing aircraft does five times the speed of the rotorcraft.

FIGURE 1. *The Bell XV-3*

The reason for the size of the gap, and the inevitability of the gap, was put by Sir Frederick Handley Page. He said that no rotorcraft—he was including Autogiros—could compete with a fixed wing machine because, when making a given journey, its wings (the rotor blades) travelled a greater distance than the journey distance. They do not take the shortest distance between two points. It is a fair criticism. When cruising, the rotorcraft's wings labour unnecessarily.

Don Juan de la Cierva, one of the greatest of inventive geniuses, addressing the Aeronautical Society on 13th February, 1930, said that the Autogiro could be made faster than the conventional aeroplane; but he named the limiting figure as

FIGURE 2. *The Lockheed XFV-1*

320 kilometres an hour (200 miles an hour) and in the intervening 25 years the gas turbine has changed our ideas about speed. Dr. Igor Sikorsky in his James Clayton lecture on 29th April, 1955, gave the same figure of 320 kilometres an hour as the helicopter's profitable speed limit. Attempts to step up the speed of rotorcraft have usually taken the form of a mingling of fixed wing and moving wing. The Fairey Gyrodyne, which has been mentioned, was a compound helicopter. It used a pair of small fixed wings and, to minimize drag and improve propulsion, it had the airscrew offset at the starboard wing tip. In this way, the drag of the anti-torque rotor at the tail of the conventional helicopter was eliminated. My experience of flying as a passenger in this machine confirmed that

it vibrated less than the conventional helicopter of its time, and that it was faster.

More recent compound helicopters are the SO 1310 Farfadet, built by the French nationalized company of the Sud Ouest and first flown on the 9th July, 1953, and the McDonnell 82 XV-1. Louis Breguet is building a compound helicopter with the rotors sunk in the fixed wings.

A more radical approach to improved helicopter speeds is the true convertible aircraft. This is represented by the Bell XV-3. It has fixed wings and twin three-bladed rotors. The rotor masts can be tilted from vertical to horizontal and so can be converted from the function of lifting to that of propelling. The Bell XV-3 is the outcome of 12 years' work on a joint Army and Air Force contract. Its design speed is 282 kilometres an hour (175 miles an hour) which is 31 kilometres an hour faster than the existing official helicopter speed record. Wing span at nine metres (thirty feet) is the same as the length. A single Pratt & Whitney engine is used. The aircraft seats four. The Bell Company states that conversion back from aeroplane to rotorcraft can be done engine off and that, in an emergency, an autorotative landing can be made.

Another convertible aircraft of similar configuration is the Transcendental Model I-G, which has done over sixty hours flying.

Between rotorcraft and fixed wing aircraft there is a bridge formed by a type of machine that is 'neither fish nor flesh nor good red herring'. It is represented by the Lockheed XFV-1, which was announced on the 17th March, 1954, and by the Convair XFY-1 which made a successful free vertical take off on the 1st August, 1954. In both, special Allison T40 turbine engines are used.

The Lockheed Salmon stands on its tail and has a tilting pilot's seat. Although the Allison turboprop has a better specific weight than most reciprocating engines, note that a system of external wings—the rotating blades of the contra-

FIGURE 3. *The Convair XFY-1 in horizontal flight*

prop—has to be used to obtain a sufficient margin of thrust over weight for take off. So power is still being applied indirectly. There is still a kind of lever between the engine and the generation of lift. Direct take off is obtained, but not direct lift.

In principle, the Convair 'Pogo', to the designs of C. G. Carroll, has nothing more to tell us than the Lockheed; but Figure 3 shows it after it has curved over into the normal fixed wing flight attitude. The aircraft, flown by J. F. Coleman, in California on 2nd November, 1954, is giving proof that the difficult problems of control and stability during the vertical take off and during the transfer to the normal flight attitude have been solved. Coleman made the transfer at a height of sixty metres and flew at 425 kilometres an hour (264 miles an hour), but without closing the canopy or altering the pilot's seat from the vertical take-off position.

Neither this aircraft nor the Lockheed Salmon can be fast because they use airscrews and suffer, to some extent, the disabilities of all aircraft with rotating wing systems. Eight hundred kilometres an hour would be about the top speed figure—the cruising speed of the Comet. But they are representative of the movement summed up by the Soviet designer Mikoyan thus: 'The power of the engine has grown so much, and speed has increased so greatly, that the aeroplane receives lift not only and not so much from its wings as from its engine.[7] They pay, as helicopters pay, for their powers of vertical take off and landing. Sir George Cayley said of the helicopter that 'For the mere purpose of ascent this is perhaps the best apparatus, but speed is the great object of this invention and this requires a different structure'.[8] Let us look at some possible 'different structures'.

Instead of using airscrews or rotors there is a more direct approach to the generation of lift. Instead of making the wings go to the air, it brings the air to the wings. It is concerned with making a wing lift without either trundling it for miles over the countryside or whirling it round and round.

Sir Graham Sutton has pointed out that, in spite of all that has been said on the subject, the aeroplane 'has no exact counterpart in the natural flight of birds'.[9] In 1925 Fullerton and Gnosspelius suggested that the weight to power ratio of birds was so high that the natural flight process must be more efficient than the artificial. At a power loading of well over 45 kilograms (100 lb.) to the horsepower, the Swift's performance could not be accounted for by analogy with flying machines.[10] Recently the point was made in a new way in a newspaper article by B. S. Shenstone.[11]

Part of the discrepancy may be accounted for by the fact that birds use powered lift. Most birds would consider themselves professionally disgraced if they had to run like mad to take off and to land or if, when in the air, they were unable to rest on their outstretched wings. Birds use powered lift and they can also glide. For take off and for landing they feed power into the air flow over their wings; they use forced circulation. Just when the aeroplane has shut down its engines prior to the touch down, most birds are pouring power into their wings. It is the 'peripteral motion' described by Lanchester in the Preface to his 1907 book on aerodynamics, the 'motion generated around a bird's wing'.[12] One new

approach to powered lift is concerned with this peripteral motion, with feeding power into the air stream around the wing and making the wing work without either translational or rotary movement. It is not the only new approach, and I am not myself going to say that it is the most promising; but it is the one to which most attention is being paid. The start was Lanchester's circulation theory of flight arising from his experiments of 1894[13] and Prandtl's mathematical statement of wing theory in 1904. (In his latest book, by the way, Dr. von Kármán, who was Prandtl's pupil, suggests that Lanchester may have provided Prandtl with the stimulus for his work because he visited him and discussed it long before Prandtl published his paper.[14]) It is not for me to do more than touch briefly upon theory.

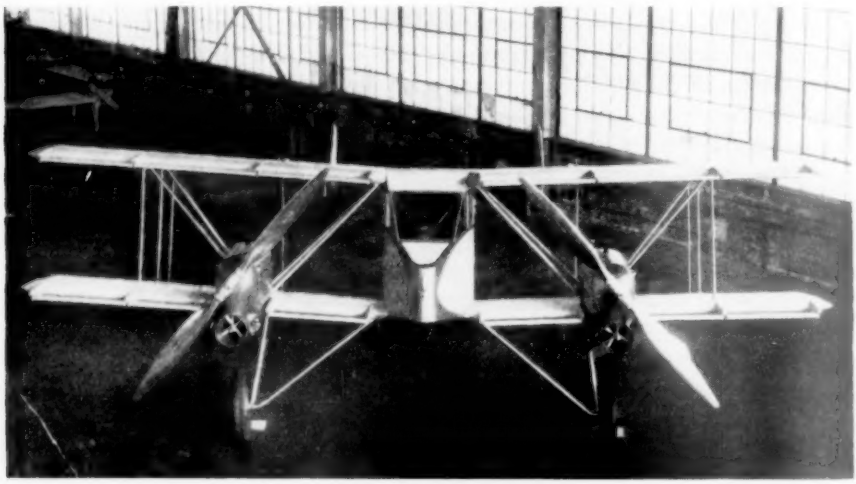

FIGURE 4. *The Crouch-Bolas Dragonfly*

When a wing is set in an airstream it creates drag. If it be inclined it creates lift; more lift than drag. But if the inclination is increased beyond a certain point turbulence begins and lift ends. The state of the boundary layer or *couche limite*, the thin coating of air on the wing surface, can provoke or prevent turbulence. The aim is to hold down the boundary layer, to make the coating stick to the surface, and so to encourage laminar flow over the wing. The first practical steps were taken by Louis Constantin in 1913,[15] by Dr. Thurston, and by Handley Page and Lachmann whose wing slot was patented on 19th February, 1918. The slots along the leading edge and along the flap persuade the air flow to cling to the surface up to bigger angles. This form of natural control of the boundary layer was carried to full development in the Handley Page Gugnunc which was second in the Guggenheim competition of 1929.[16] Group Captain England, then Handley Page's chief test pilot, allowed me to fly in the Gugnunc and I can testify to its ability to sit up at steep angles without stalling. It could land in 19 metres (21 yards). Its speed range was nearly four to one. That is natural control of air flow. In its latest form it is seen in the Scottish Aviation Pioneer.

Birds use wing slots of a kind: but they also use wing flapping, so perhaps I ought to make a passing reference to the Soviet Kashuk glider seen in flight at Tushino last June.[17] This has articulated wings and a recuperative flapping system worked by compressed air.

So much for natural or nearly natural methods of control. Now we come to the first essays in powered control. I have not found evidence of successful full-scale work before the Crouch-Bolas experiment of 1930 and onwards.[18] The air stream is accelerated over the wings and wing flaps by engine power, using the slipstream from the airscrew. The weight is held up partly by thrust and partly by aerofoil lift. The Crouch-Bolas Dragonfly twin-engined biplane was made to test this scheme and it showed a wide speed range—from thirty kilometres an hour to 210 kilometres an hour (19 miles an hour to 130 miles an hour); a ratio of seven to one. It could be landed in still air with a run of eight metres.[19] The aircraft, which was built in America, was arranged so that the airscrew discs covered a big part of the wing span and thus exerted the slipstream effect to the fullest extent. At the time, the idea aroused less attention than it deserved. But I am glad to say that it is now reported that a Crouch-Bolas improvement patent was granted on the 15th August, 1953, and that work is going forward on a new aircraft embodying the system.[20] Other aircraft which tried the same system were the Chance-Vought V-173 and the Chance-Vought XF5U-1.

We now come to a name which recurs in the story of recent aeronautical invention and research of the most advanced kind, the name of A. A. Griffith. Dr. Griffith's aerodynamic theory of turbines was announced in 1926.[21] In 1927 Sir Bennett Melvill Jones reported to the Aeronautical Research Committee on streamlining, pointing out that two thirds of the power of an air liner was used for overcoming drag due to turbulence.[22] But streamlining alone did not seem to be the cure. Griffith designed a wing which held better promise. It used suction along the trailing edge.

Prandtl had envisaged the possibility of using suction; but the Griffith wing was expressly designed as a suction wing. It was, in its original form, a fat wing with a cusp along the trailing edge where suction was applied. It was tried in Australia. A car engine was installed in a glider and used to generate suction. When towed by a Dakota the take-off time for the glider with suction on was halved. Keeble interpreted the results as meaning that, for the same fuel and same range, an all wing air liner using suction would have forty per cent more load and be forty per cent faster.[23]

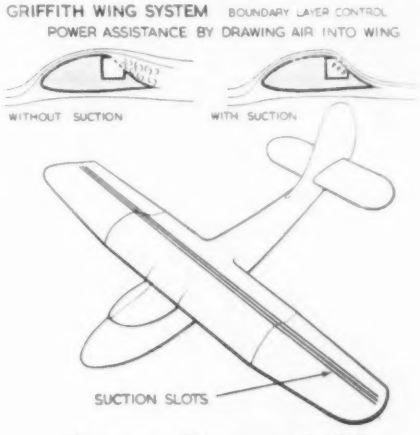

FIGURE 5. *Diagram of Griffith wing and Australian glider*

Other methods of applying suction were proposed. Dr. Preston suggested porous surfaces, and Brian Thwaites wing surfaces with spanwise slits.[24] F. G. Miles suggested perforated metal surfaces. In 1936—the year in which a Fieseler Storch with suction wings was being tried in Germany[25]—Miles began his experiment with his twin-engined BLS Peregrine. Air was drawn through the perforations by a modified cinema ventilation fan driven through gears by a Ford car engine. Mr. Miles tells me that the engine was not suited to the job, and that by substituting a gas turbine like a Turboméca the same wings would give better results. As it was, there was a 29 per cent improvement in climb in return for an expenditure of eight horsepower on suction. The BLS Peregrine was a pioneer in this field. The use of blowing, as well as sucking, was proposed by Regenscheit in 1939,[26] and during the war Arado, Messerschmitt and Dornier produced designs.

Still there were doubts in this country. Royal Aircraft Establishment wind tunnel work did not dispel them. The recent revival of interest is a sequel to the coming of the gas turbine. The gas turbine not only lowered the specific weight of aero-engines, it also substituted a continuous fluid flow process of power generation for an intermittent. The gas turbine was a mechanism for sucking and blowing, or for doing the very things which wings were asked to do.

The gas turbine acts through pressure differences; the wings act through pressure differences. Both are pressure modulators. Bleeding air from the compressor for boundary layer control in swept wing aircraft was proposed by Poisson-Quinton, but before this was tried other promising work had been done. Melvill Jones and Head did full-scale experiments with an Anson, using calendered nylon as the porous surface.[27] Dr. Sydney Goldstein, in the eleventh Wright Brothers lecture of 1947,[28] summed up the situation at that date in a clear and practical way that gave fresh impetus to the movement. Sir Frederick Handley Page's Louis Blériot lecture of 1950 presented remarkable comparative figures for existing aircraft, with and without boundary layer control. Sir Frederick called it 'energized circulation', which was defined later by Dr. Lachmann as an extension of boundary layer control.[29]

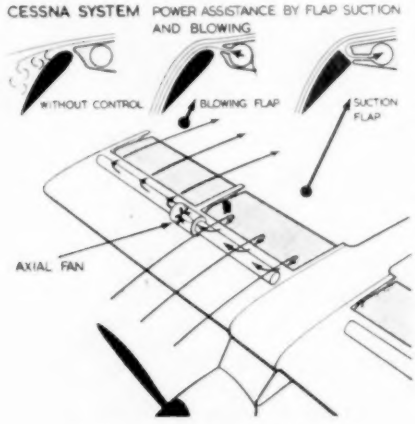

FIGURE 6. *Cessna diagram*

In response to a United States office of naval research contract, placed in 1951, the Arado system of blowing and sucking—to the patents of Wagner and Doepp—was installed in a Cessna 319A. A hydraulic motor works an axial fan which is buried in the wing between the sucking and blowing sections. Suction is used on the inner part, blowing on the outer part.[30] In spite of the additional weight of the boundary layer control system of ninety kilograms (200lb.) the performance improvement is noteworthy. Take-off

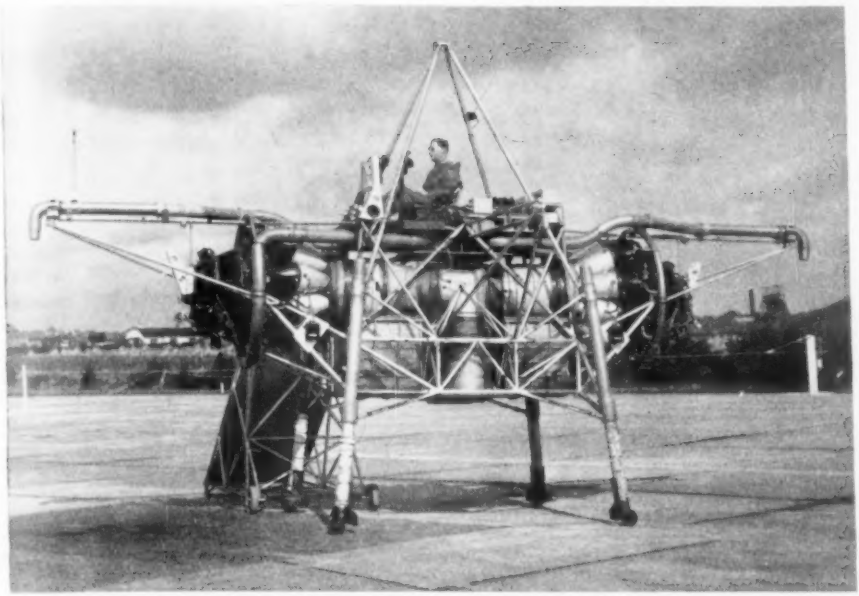

FIGURE 7. *The Rolls-Royce TMR 'flying bedstead'*

run is reduced from 90·4 metres (297 feet) to 58 metres (190 feet), the rate of climb is improved from 5·8 metres a second to 5·9 metres a second, the angle of climb is steepened, and the landing run is shortened from 78·5 metres (258 feet) to 48·8 metres (160 feet).

New work at the Royal Aircraft Establishment, first revealed in the discussion following Dr. Lachmann's lecture, is even more promising. In a sleeve with porous surface, full chord laminar flow was attained. Johnson reported that the drag reductions were 'impressive' with a seventy per cent reduction excluding induced drag.

Now we come to a merging of boundary layer control and gas turbine. It is the Grumman F9F-A Panther ship-borne fighter. It has the Attinello flap, which uses blowing. The air is ducted from the engine compressor. Take-off speed is reduced by 37 kilometres an hour (23 miles an hour) and that with an additional load of 1,360 kilograms (3,000 lb.). The weight of the blowing apparatus is only 22·7 kilograms (50 lb.). There has been an important sequel to the success of boundary layer control in the Panther. It is a production order for the Lockheed T2V–1 with boundary layer control. It is the first time the series manufacture of this form of powered lift has been undertaken.

All these methods of improving the low-speed capabilities of fixed wing aircraft have this in common: that they feed energy into the air stream. Instead of accepting the natural yield of lift over drag, they step up the yield artificially at low forward speeds by directly energizing the circulation. Dr. Lachmann put it that 'kinetic energy is infused into the boundary layer'. An aircraft is created

FIGURE 8. *The Bell VTOL*

which *is* a fluid flow apparatus not depending wholly upon translational motion in order to lift. But there is another, even more direct, kind of powered lift: it is jet lift. The most representative examples which have so far flown are the Rolls-Royce thrust measuring rig and the Bell VTOL. Ryan are building a direct lift machine but it has not yet flown.

The 'flying bedstead' is mainly the work—again—of Dr. Griffith. It depends upon its engines giving a thrust greater than its laden weight. The Wright Brothers engine weighed about 6½ kilograms to the horsepower—much more, by the way, than Clément Ader's steam engine of the 1890s—and neither the Wright engine, nor the thousands of reciprocating engines which followed it, could have lifted themselves let alone an airframe as well. They all required the mediation of wings. The gas turbine changed all that.

Dr. Hooker summed up the improvement in specific engine weight when he said that the Rolls-Royce Derwent turbojet weighed about one eighth a comparable reciprocating engine.[31] Specific weights are still going down. The Soar gives 6·8 kilograms of thrust for one kilogram of weight, a specific weight of 0·15. A figure of 0·1 may soon be within reach. The 'flying bedstead' does not use a figure as good as this. Its control and stability are secured—as they must be with an aircraft that can hover—by a completely different means from that employed in an aeroplane. Jets of air bled from the engine compressors are used at four balancing points. The system was developed by Rolls-Royce in collaboration with the Royal Aircraft Establishment. The control jets are worked

by an ordinary stick and rudder bar. My old friend Captain Shepherd, who died recently, made the first flights.

The Bell VTOL differs from the 'flying bedstead' mainly in that it uses a separate gas turbine for supplying compressed air for the control jets, and in that the two main lifting engines can be rotated in the manner proposed by Keith Lucas in 1952.[32] In flight, the engines can be swivelled round and used for propulsion, lift then being obtained from the small fixed wings.

Both these aircraft use jet deflection, and jet deflection may become an ally to boundary layer control. It was successfully demonstrated by the French nationalized company of SNECMA at the Paris Salon at Le Bourget in 1953. In this instance, it was used for braking after landing. The jet deflector designed by the National Gas Turbine Establishment can contribute to the lift.

A Meteor with this deflector was prepared by Westland—a company which has experimented with blowing over flaps in swept wing aircraft.[33] The Meteor first flew in May, 1954, and the pilot, Squadron Leader de Vigne, reported a reduction of twenty per cent in approach and stalling speeds with jet deflection.

We have now looked at compound helicopters, convertible aircraft, fixed wing aircraft using boundary layer and circulation control, and at direct jet lift aircraft. All these have been aimed at the same target: the improvement of speed range. I must here repeat that there are other methods. There is the trapped vortex idea for maintaining laminar flow. It was put forward by C. D. Perkins and D. C. Hagen at the Anglo-American Conference of 1953. The idea arose from the discovery that the flow in a wind tunnel could be kept smooth by fluting the walls downstream. Work is going on at Princeton University with wings employing a trapped vortex shape.

Then there are variable sweep-back inventions which originated with the work of Launay and Sommier in 1943, and were continued with the flight trials of the Bell X-5 in 1952 and brought to a more advanced stage by the Baynes Patents.[34] A Baynes patent of 1952 is for an aircraft with variable sweep wings and tail surfaces. The calculated speed range is ten to one.

Then there are contributory inventions. The Rolls-Royce conception of a wing which is in itself an air intake for what is called an 'air consuming propulsion system', is given in a Patent of 1951.[35] The American Marquardt company has produced a small wing which *is* a ram jet. It is intended for helicopter rotors. These bring closer the wing-engine compact predicted by E. F. Relf in 1946. 'The jet engine's progeny', he said, 'may well become almost purely aero-dynamic.'[36]

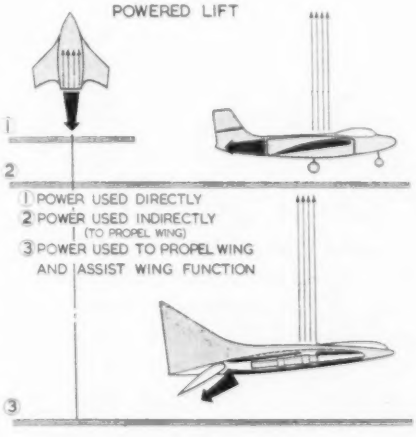

FIGURE 9. *Diagram of direct and indirect lift*

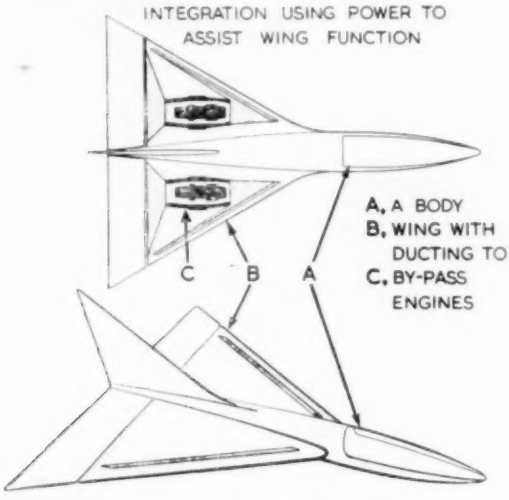

FIGURE 10. *Delta with by-pass engines ducted to blown flaps*

Various ways of obtaining powered lift have now been examined: direct jet lift; indirect lift through translational motion as in a conventional aeroplane; jet deviation, and blowing and sucking over parts of the wing. A little speculation may be permitted on how some of these things might be combined and developed.

If direct jet lift is considered, but without standing the aircraft up on its tail and having the inconvenience of a tilting pilot's seat, we have Mr. A. G. Elliott's indication of one of the directions of design thought. He said that it might be possible to produce an aircraft taking off as the 'flying bedstead' does, using clusters of lift engines, and then transferring to wing-supported flight with a separate set of propulsion engines. Lift by translational motion would then be combined with direct lift. Mr. Elliott added that it would be 15 years before such an aircraft could appear.

A less drastic step would be a merging of blown flaps, by-pass engines and jet deflection. The first by-pass engine to complete successful flight trials was the small Turboméca Aspin. The much bigger Rolls-Royce Conway by-pass engines are specified for the new Vickers 1000. Sir Roy Fedden has suggested that some form of by-pass engine will be used in the air liners of the future.[37] In most wing sections, suction is applied near the trailing edge, but there has been work on sucking through a porous nose.[38] If it were possible to have a clean flow from the wing and leading edge through the engines, and over the blown flaps, a high degree of integration would be secured.

Integration is the aim of something more advanced, a design unifying body, engine and wing system, the Zborowski coleopter.[39] This looks visionary; but free flying trials of a scale model powered by a pulse jet have been made successfully by SNECMA. And it was seen earlier that the problems of taking off vertically and then curving over to the horizontal flight attitude have been solved. Zborowski calls it a coleopter because of its sheath wing. The engine is accommodated in the centre of the annulus behind the cabin and this annulus is itself either a ram jet or a ducted fan in flight. Note that all the components have been proved to work. The coleopter is, in fact, the logical outcome of experiments that have been going on in France since 1907, when René Lorin proposed his *tuyère propulsive*. The latest propulsive duct, to René Leduc's

designs—which is to fly soon—resembles the coleopter in that there is a central turbojet surrounded by a tube which gives an induced flow for take off and landing and which, in flight, becomes a ram jet.

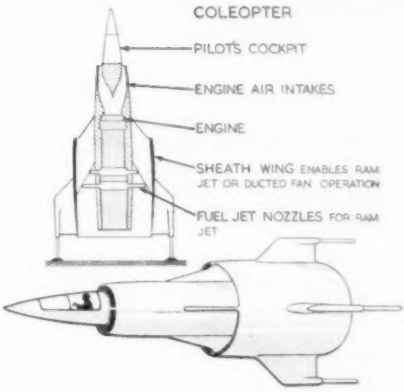

FIGURE 11. *Zborowski coleopter*

Quite recently information has been released of the first man-carrying ducted fan. Built for the United States Navy, and resulting from experiments which have been going on since 1947, the new Hiller flying platform uses shifts of the weight of the pilot as a means of control. Thus we come full circle, for over sixty years ago Lilienthal and then Pilcher used body movements to control their gliders. Tethered flights with the ducted fan were made in 1952 by the National Advisory Committee for Aeronautics.

Blown flaps are proving successful; direct jet lift has been shown to be practicable; ducted fans and ram jets have been flown successfully. When these things are appropriately combined, whether as a coleopter or as some new configuration, we may perhaps arrive at an air vehicle capable of cruising at speeds near the speed of sound, yet also capable of taking off from an aerodrome no larger than the roof of a railway station.

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DISCUSSION

AIR COMMODORE SIR VERNON BROWN, C.B., O.B.E.: Could Major Stewart tell us actually how the coleopter lands? Does the pilot bring her round slowly and then put her down from the horizontal to the vertical position?

THE LECTURER: The method visualized is that it again takes up a nose-up, vertical position, and then lowers itself on its landing area.

MR. G. W. R. NICHOLL: Is nothing at all being done, in view of the cost of the tremendous land runways to-day, to make use of the sea runways God gave us? Is any experimental work being done in that direction?

THE LECTURER: So far as I know we have given up flying boats officially in this country. I think it is a great pity, and I agree with you that it is a terrible thing that we should waste the free runways all round our coasts.

MR. F. HOLOUBEK: Since the problem of vertical take-off and hovering is essentially one of control, how does, in the lecturer's view, the development of the control system abroad match with that of the lifting system, particularly in respect of the transition stage from hovering to horizontal flight?

THE LECTURER: The systems of control used in the 'flying bedstead' and in the Bell are said to be similar, but no details have been given of either of those methods. We only know that they work on compressed air. They are said to be quite effective for the very limited conditions under which those two aircraft have flown so far. Of course, the Bell converts in flight to an ordinary aeroplane and then uses ordinary aeroplane controls. You saw in the film that it had its rudder, and it had ailerons. Once it has got moving it goes over to a perfectly normal set of aeroplane controls. The controls for hovering must be completely different, because there is then no such thing as steerage way; the controls for hovering seem to be effective as far as we have had them demonstrated.

PRINCE VIAZEMSKY: Could the lecturer tell us how the first dates of flying of the 'flying bedstead' and the Bell compare?

THE LECTURER: An awkward question, but as it comes from Prince Viazemsky, who I think is one of the great pioneers of aviation (he was working on it well before the first world war), I must try and answer it. I am not absolutely sure of the first flight date of the Bell. We know that the 'flying bedstead' had flown last year, before September, because the announcement that it had flown was made early in that month. I do not think the Bell flew until some months after.

A vote of thanks to the Lecturer was passed with acclamation, and the meeting then ended.

GENERAL NOTES

HÄLSINGBORG EXHIBITION

The ancient Swedish seaport of Hälsingborg is gay with flags, and set out along the waterfront is staged the first major exhibition on Swedish soil since the still famous Stockholm display of 25 years ago. None who visit the exhibition are likely to regret their journey, for it is the perfect setting for a summer exhibition.

The larger number of the pavilions, which house the main core of the exhibition, are built on a comparatively narrow sea wall, some half a mile long, which encloses the harbour, alive with its shipping, and which separates this from the open sound, with Denmark's Elsinore and the old Kronborg Castle in view on the other side. This part is linked with a section devoted to architecture, town planning and building techniques by a bridge which spans the busy dockland scene and takes the exhibition, by way of a spacious entrance courtyard, close to the heart of the town. Here flags, posters and music from loudspeakers attract those visitors who prefer access by land to the short water crossing in one of the gay fussy little ferry-boats which will land you beside the long glass wall of the Swedish Industrial Design Hall.

Everywhere in Hälsingborg the exhibition symbol H.55 advertises the whole-hearted collaboration of townspeople and shopkeepers. In a wide range of colours the simple, almost heraldic initial, with its condensed numerals on the right-hand vertical, announces this support, and H.55 flaunts itself on flags of all shapes and sizes on posters, scarves, badges, confectionery, matchboxes, and even in floral set pieces. So successful as a design is this device that one is almost tempted to enquire of the promoters whether its possibilities may have dictated their choice of venue.

The exhibition is devoted primarily to presenting Sweden and her products to the world, although the other Scandinavian countries are well represented, and there is also a small international section composed of a row of eight model flats designed and furnished by architects from—in addition to Sweden—Denmark, France, Finland,

C.o.I.D photograph

The living-room of the British show-flat

Western Germany, Switzerland, Japan and Great Britain, justifying the promoters' claim that this is a pocket size world exhibition.

The Swedish national exhibits in the fields of furniture, glass, ceramics, silver and textiles have all been selected by Svenska Slöjdföreningen (the Swedish Society of Industrial Design) and represent the uniformly high standard of design achievement, which we have come to associate with Sweden since she gave the lead in the realm of the domestic arts at the Stockholm exhibition of 1930. But those of us who have developed a craving for novelty were largely disappointed, for there is nothing revolutionary here, and very little that appears to stem from any fresh creative thought. In most highly industrialized communities, the need to produce and go on producing in quantity has necessitated a largely artificial stimulus to innovation, not so much for the sake of change, but simply to keep the wheels revolving, men and women employed and shareholders satisfied. Here in Sweden we were reminded once again that the change from handcraft to industrialization produced no break with tradition; and that a continued and peaceful development of the domestic arts can result in rare perfections of form and finish. Yet something at the back of our mind makes us ask whether just such perfection, lacking other stimuli, may not lead in the end to sterility.

However, the opportunity of comparison with the design standards of other countries was there before us. No better means of illustrating these could have been devized than the series of small flats which demonstrated how some one or more designers from each country would plan and furnish a small middle-class home.

As with the Scandinavian exhibits, the Japanese flat displays a firm link with their own traditions of house design and furnishing, successfully blending these with modern counterparts largely under the influence of North American design trends. There remains an air of simplicity and spaciousness which proved a considerable attraction, but which demanded the presence of some appropriate owner to complete the scene. Exhibiting some good individual pieces, including textiles and ceramics, the general atmosphere of the German contribution seemed over heavy and somewhat harsh. The French flat, also with many pleasant objects, lacked consistency of style. The Finnish and Swiss rooms, particularly the latter, made little or no concession to the foibles of humanity, providing correct and austere machines for living in.

The flats from Sweden, Denmark, and more especially our own British exhibit, have a more hospitable and homelike air, more successfully avoiding the pitfall of the showpiece. Perhaps it is merely to our way of thinking that the Scandinavian rooms seem just a shade too tasteful—too elegant to be true. The British flat makes up for this in no uncertain way, being cram full of good things at the risk of inducing æsthetic indigestion. But this is how we like things, from the knick-knacks on the shelves to the bowler hat and golf bag in the hall; the hunting boots were perhaps a mistake, excused because we do make them well, but a pair of ladies hacking boots would have been so much more appropriate these days.

There is no doubt that the Council of Industrial Design who organized the British exhibit, Mrs. Jo Pattrick, who arranged the flat, and the British manufacturers who sponsored the exhibit, deserve the highest praise.

H.55 has already been the host to several conventions and special events, among others to two hundred design delegates from 14 countries who debated the subject 'Good Design for Everybody—Reality or Utopia'. Delegates to this congress included speakers from the Council of Industrial Design, and from the Faculty of Royal Designers for Industry.

The moral if any, established after much discussion, was that usefully to serve the community the industrial designer must find a mean between his highest flights of fancy and the stern requirements of economic industrial production. H.55 illustrates how far and how successfully Sweden has progressed to achieve this compromise.

MILNER GRAY

SINGAPORE ARTISTS

A most interesting Exhibition of paintings by Singapore Artists is at present on view at the Imperial Institute. The exhibition, which was opened on 18th July by the Commissioner in London for Malaya and Singapore, contains works by six members of the Singapore Art Society. This body was formed only six years ago, but already has considerable prestige in South-East Asia. The present exhibition, organized by Mr. Ho Kok Hoe, President of the Singapore Art Society is, as the Commissioner stressed in his opening speech, the first to be held outside Singapore by members of the Art Society. After the opening, Mr. Hoe gave a talk and a demonstration of Chinese brush painting to illustrate the four 'moods underlying Chinese art.

The exhibition will remain open until 21st August. Admission is free.

TRANSPORT RESEARCH GRANT

Applications are invited for the sixth Rees Jeffrys Studentship. This is tenable at the London School of Economics and will enable the holder to devote at least one whole year to full-time research into the economics of transport. The Studentship is open to any person who is or has been engaged in the administration of transport or in the production of transport equipment or facilities, and to University graduates. The Studentship, which will be of the value of £500, will be tenable from 1st October, 1955, for one year. Full particulars and application forms can be obtained from the Registrar, London School of Economics, London, W.C.2.

YOUTH ORCHESTRA

The National Youth Orchestra, founded in 1947 to further the musical education of promising young musicians in this country, invites applications before the end of July from young people aged from 13 to 19 for the auditions to be held in the autumn. The members meet for one week three times yearly, during the school holidays, and pay a fee of seven guineas for each of these Courses. A few Scholarships are available. At the end of each Course, having worked under eminent conductors, the orchestra gives a concert and from time to time plays abroad. No commercial commitments are entered into.

Application forms for audition, and further details, can be obtained from the Secretary, National Youth Orchestra, 90, George Street, London, W.1.

NOTES ON BOOKS

OUTRAGE—*A special number of the Architectural Review, June*, 1955. 5*s*

Perhaps there is still hope, since seldom before can an issue of a monthly periodical have received such widespread support in the editorial columns of the daily press as has the *Architectural Review's* appalling but public spirited survey of our national indifference to the spoilation of our countryside—and not only of our countryside for, as the editor rightly emphasises, this disease of 'Subtopia' (that terrifying idealization of Suburbia) is not simply a matter for the Council for the Preservation of Rural England, but for everyone.

It is not only the countryside that is being nibbled away by the tentacles of our towns but the towns themselves are being bedevilled by the same mean values, neither urban nor rural nor yet honestly suburban. The West End of London is no exception since in Piccadilly itself we have suffered without protest the intrusion of grotesque hoardings protected by refined little gardens with dwarf brick walls and wrought iron gates. The fact that country folk up for the day may gaze on these bill-posters' flower beds and find them pretty proves only that Suburbia has invaded the countryside as well as the metropolis and, as the *Architectural Review* warns, a refined rusticity has become the universally accepted standard.

These municipal and commercial doilies, these banal attempts to prettify the ugly are the real symptoms of our national disease. However horrible are the outright vandalisms of the Service Departments who litter the land with disused dumps and camps and airfields; however callous the appetite of the speculative builder for fresh fields and downland; however ruinous the arterial roads that stretch the suburban sprawl from one town to the next, like flypapers collecting the fag ends of our motorized society; or however insensitive are local authorities to all questions of scale and propriety, it is this *petit bourgeois* pretentiousness, this camouflage of the actual by the make-believe that is really alarming, for it runs right through the community from the sanitary engineer to the university don.

A Victorian critic once put his finger on the Achilles heel of taste when he protested against borrowing ornaments expressive of lofty associations and applying them to mean objects. He was speaking of the exhibits in the Crystal Palace, but today he would find the same false values spread from end to end of the country.

The *Architectural Review* has deliberately pitched this special issue in a rather high, hysterical key and has perhaps exaggerated the pace of the decay (though the route from Southampton to Carlisle must be fairly typical of many cross country journeys) but a calmer voice might have fallen on deaf ears. As it is, this prophecy of doom seems at least to have stirred some influential consciences and may yet do more if the B.B.C. and other organs of mass communication would take up the cause, though those who remember the gallant fury of Clough Williams-Ellis's *England and the Octopus* and *Britain and the Beast* may, a generation later, be excused their pessimism.

PAUL REILLY

FROM THE JOURNAL OF 1855

VOLUME II. *13th July*, 1855

From a letter on The Panopticon Principle of Building Factories, by M. S. Bentham.

Sir,—The Society of Arts have already honoured the memory of the late Sir Samuel Bentham by the insertion in its *Journal* of details of several of his improvements; and I would now solicit attention to another of them. . . . I allude to *Panopticons*, that is, buildings which from their mode of construction, afford a point of central observation, from which all that is going on within their walls may be inspected. Jeremy Bentham (Sir Samuel's brother), in a letter to their father, ascribes the origin of this invention to Samuel's observation at Paris, that in a public educational establishment there, an inspector perambulated the sleeping apartment of the pupils during the whole night, to observe through a glass window, whether any of the inmates of the separate chambers were stirring or misconducting themselves, but it was not till the year 1786 that Sir Samuel carried his ideas into effect. . . .

In this country the Panopticon principal has hitherto been only adopted for prisons, and it is only of late years that its efficacy has been generally acknowledged. Yet it would seem that it is no less desirable for the purpose it was originally designed for, namely, a *manufactory*.

Without recurring to the effect of the 'Master's Eye', it must be admitted that supervision of the several subordinates employed is no less conducive to the prosperity of a manufactory than is the overlooking of the operatives, and this effect can only be insured in a Panopticon, for it is only from a central point of observation that the many chambers of a manufactory can be at once inspected. This in a panopticon is feasible by either its proprietor, his partner, his chief manager, or by any other person appointed to perform the important business of general inspector. . . .